Theories of Learning

What is learning?

Learning is a process which includes all those changes & modifications in the behavior of an individual which he/she undergoes to meet environmental requirement.

Nature of Learning

1. **It is a process, not a product.**
2. **It covers various domains of human behavior**
    a. **Conative**
    b. **Cognitive**
    c. **Affective**
3. **Learning & Maturation are different.**
4. **It does not include behavioral changes due to maturation, fatigue, illness or drug**
5. **Learning includes changes in behavior but not necessarily Positive Changes.**
6. **Learning is transferable from one situation to another.**

Three Elements of Learning

1. **Learner- whose behavior is to be changed**
2. **Learning Experience- For bringing behavioral changes in learners behavior**
3. **Men & Material Resources- Needed for desired changes.**

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IT

Factors related to Learning

1. Learner's Physical and Mental Health.
2. The basic potential of the Learner.
3. Readiness and Willpower.

Classification of Learning Theories

Learning Theories can be classified into four parts

1. Classical Theories
   - Oldest Theories
   - Given by Plato
   - Previous Learning is important for learning new things (Platonic Epistemology)

2. Behaviorist Theories or Connectionist Theories
   - Studies behavior & Learner's response in Learning Environment
   - Can be divided into two parts
     a) Classical Conditioning (Ivan Pavlov)
        - AKA Habit Formation Theory
        - Passive Learning

     b) Operant Conditioning (B.F Skinner)
        - Human Learns through 'Re-inforcement'

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3. **Cognitive Theory**
    - Propounded by 'Wolfgang Kohler' and his associate (Koffka, Werthemier, Lewin)
    - Learner assess overall surrounding and work on the basis of Insight

4. **Constructivist Theory**
    - Propounded by Jean Piaget
    - NCF' 2005
    - 5 'E' Model of Constructivism
        1. Engage- Readiness of Learner
        2. Explore- Let the learner explore the topic
        3. Explain- 'Better Knowledgeable Other' would explain the topic
        4. Elaborate- More deeper understanding
        5. Evaluation- Testing the learning level of the learning

Theories of Learning

1. *Trial & Error Theory of Learning/ Connectionism Theory- Edward Thorndike*
2. *Theory of Classical Conditioning- Ivan Pavlov*
3. *Operant Conditioning- B.F Skinner*
4. *Insight Theory- Wolfgang Kohler*
5. *Social Learning Theory- Albert Bandura*
6. *Humanistic Theory of Learning- Abraham Maslow*

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7. *Field Theory- Kurt Lewin*
8. *Theory of Experimental Learning*
9. *Contiguous Conditioning- Edwin Ray Guthrie*
10. *Neuro-physiological Theory- Donald Hebb*
11. *Systematic Behavior Theory- Clark. L. Hull*
12. *Sign Learning- Edward Tolman*
13. *Three Stage Information Processing Theory- Atkinson & Shiffrin*
14. *Theory of Levels of Processing- Kraik & Lokhart*

Trial & Error Theory of Learning- Edward Thorndike

- **Edward Thorndike (1874- 1949), an American psychologist**
- **Father of 'Education Psychology'**
- **Gave Trail & Error Theory in 1898 in his PhD research whose title was Animal Intelligence**
- **His Theory on Learning AKA Connectionism/ Stimulus- Response Theory/ S-R Theory**
- **Experimented on chickens/ rats/ cats**

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Experiment-

- **In one of his popular most experiments, he puts a hungry cat in a 'puzzle box'**
- **There was only one door which could be opened by correctly manipulating a latch. A fish was placed outside the box. The smell of the fish acted as strong motive for the cat to act.**
- **Initially, she tried to squeeze through every opening, bite the bars, tried to reach the fish through her paws.**
- **In these random movements, the latch was manipulated accidentally.**
- **In another trail, the process was repeated and this time cat took less time in manipulating the latch.**
- **In subsequent trails, incorrect responses like biting, clawing etc, gradually reduced.**
- **Finally, cat learned the art of opening the door.**

The experiment followed Seven Stages in the process of learning-

1. **Drive/ Motive- Hunger**
2. **Goal- To get fish**
3. **Block- Closed door**
4. **Random Movements- Wild tries to come out of the box**
5. **Chance Success- By chance opening of door**
6. **Selection of proper movement- correct way to manipulate door**
7. **Fixation of Right Response- At last cat learned the way to open the door**

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Thorndike's Law of Learning

(A) Primary Law of Learning

1. **Law of Readiness**
   - **Learners state to participate in learning**
   - **If child is ready to learn, he will learn more quickly.**
2. **Law of Effect**
   - **Satisfaction with the learning- Fixation**
   - **Dissatisfaction with the learning- Learning is blocked**
3. **Law of Exercise**
   - **Includes;**
     - **Law of Use (Learning improves with practice)**
     - **Law of Disuse (Weakness of connections/ forgetting when practice is discontinued.**

(B) Secondary Laws of Learning

1. **Law of Multiple Response**
   - **When individual is confronted with new situations, he/she may respond in variety of ways**
2. **Law of Attitude**
   - **Learner's performance is based on healthy attitude towards the task.**
3. **Law of Analogy**
   - **Individual response in New Situation will be based on his past experiences.**

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4. **Law of Associative Shifting**
    - **Learners 'Response' can be conditioned by introducing the stimulus.**

Theory of Classical Conditioning- Ivan Pavlov

- **Ivan Pavlov (1849- 1936), a Russian Psychologist**
- **Nobel Prize in Medicine (1904)**
- **While studying the functioning of the digestive system, Ivan Pavlov encountered an unforeseen problem;**

The dogs in his experiment salivated not only while eating but also when he saw the food, on noticing the man who usually brought food for him and even after hearing his foot step. Pavlov studied this phenomenon through one of his most popular experiment;

Experiment:

- **Pavlov kept a dog hungry for few days and tied him to an experimental table, In which dog movement was curtailed and certain mechanically controlled devices were installed.**
- **The dog was given food through an automatic mechanism which included '*Ringing of Bell*' before presenting the food.**
- **After few trails, dog started salivating when the bell was rung.**

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Experiment can be concluded as following;

1. **Unconditioned Stimulus (US) → Unconditioned Response (UR)**
   (Food) (Saliva)

2. **Conditioned Stimulus (CS) → Conditioned Response (CR)**
   (Food+ Bell) (Saliva after Ringing of Bell)

Principle of Classical Conditioning;

1. **Extinction: If conditioned stimulus (Ringing of Bell+ Food) is presented number of times without food, the magnitude of conditioned response (Salivation) begins to decrease and over a period of time extinct. This is called as *'Disassociation of S-R association'***
2. **Spontaneous Recovery: Pavlov discovered that after extinction when association of S-R is established again, the behavior of the learner re-appear again, but at reduced intensity.**

3. **Stimulus Generalization: Responding to similar kind of stimuli in a generalized manner. Instead of Bell, playing a musical instrument bring similar response.**

4. **Stimulus Discrimination: It is opposite of Stimulus Generalization. If dog is presented food after flashing of light than beating of drum would not bring Conditioned Response (CR).**

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Classical Conditioning- John B. Watson

- An American Psychologist (1878-1958)
- Father of Behavioral Approach in Psychology
- Experimented on 9 month old baby called Albert (Thus his experiment was named as *Little Albert Experiment*)
- Watson gave a rabbit to him.
- Child enjoyed playing with his fur but whenever he touched rabbit's ear, the rabbit started making angry sound.
- This scared the child and he not only avoided rabbit but all those soft things which were similar to rabbit.
- Watson termed this as 'Process of Conditioning'

Operant Conditioning- B. F Skinner

- An American Psychologist (1904- 1990)
- Book: The Behavior of Organism (1938)

  Evolution of Behavior, an Article in Journal of Experimental Analysis of Behavior (1984)

- Operant Conditioning refers to a kind of learning process where learner's response is more frequent (based on fee-will) regardless of the stimulus.
- Thus, skinner rejected Pavlov's Classical Conditioning where Pavlov propounded No Stimulus= No Response in his article 'Evolution of Behavior' (1984)

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- He argued that Organism is naturally active and often manipulate environment rather than just responding to environment.
- Thus, he came up with his own theory based on his experiment on rats & pigeons.
- Operant Conditioning AKA R.S Theory

Skinner's Experiment-

- Experiment: 1 (On Rats in 1938)
    - A hungry rat was put in 'skinner box' which was an automatic machine, In which if rats used to push the lever, he used to get food (a tablet)
    - At first, rat made numerous responses; he tried to chew the walls, smelled it and finally pushed the lever.
    - After sometimes whenever he was put in the box, he used to straight away push the lever to get the food.
- Experiment: 2 (On Pigeon in 1943)
    - Similar kind of experiment on pigeon.
    - Pigeon was to touch the button with his beak to get the food.

On the basis of the his experiments, he gave the concept of Reinforcement;

- Reinforcement- Process of presenting rewards (Stimulus) for initiating response.
- Reinforcer- Stimulus which initiate response
    1. Positive Reinforcer. E.g. Food, Water etc.
    2. Negative Reinforcer. E.g. Loud Noise, Electric Shock etc.

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Differences between Negative Reinforcer and punishment

- **Negative Reinforcer: Promotes a particular behavior**
- **Punishment: Weakens a particular behavior**

The Schedule of Reinforcement;

1. **Continuous Reinforcement Schedule**
2. **Fixed Interval Reinforcement Schedule**
3. **Fixed Ratio Reinforcement Schedule**
4. **Variable Reinforcement Schedule/ Inter-mittant Reinforcement Schedule**

Mechanism/ Factors of Operant Conditioning;

1. **Shaping-**
   - **AKA 'Step by Step Process'**
   - **There are situation where learning is difficult by random responses. E.g. Learning of a foreign language**
   - **Thus need arises to facilitate 'Step by Step Learning Process' called shaping.**
2. **Chaining-**
   - **Refers to the process of shaping where task is broken into small steps.**
3. **Discrimination or Cueing-**
   - **In Skinner box, the animal learns to press the lever when light is on and thus on light becomes cue signal for operant behavior.**

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4. **Generalization-**
    - Refers to ability of an organism to respond in same manner to a similar stimuli (Same as Stimulus Generalization of Pavlov)

Difference between Classical & Operant Conditioning-

	Classical Conditioning	Operant Conditioning
1.	Emphases on 'S'-Stimulus. Thus, called '*Type- S Conditioning*'	Emphases on 'R'- Response. Thus, called *'Type- R Conditioning'*
2.	Organism is passive.	Organism is active
3.	Ignores individual's curiosity.	Gave attention to individual curiosity.

Insight Theory- Wolfgang Kohler

- A German Psychologist (1887- 1967)
- Books: The mentality of apes (1925)
  Gestalt psychology (1929)
- Kohler was Gestalt Psychologist who gave Insight Theory in 1925.
- ***Gestalt:***
    - The word 'Gestalt' is taken from German Language whose nearest English synonym is Wholistic.
    - Propounded by Max Wertheimer
    - Other famous psychologist includes;
        - Wolfgang Kohler
        - Kurt koffka
        - Kurt Lewin

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- ***Insight Theory;*** **An individual perceive problem from multiple angle which results in 'Sudden Insight' AKA (Aha Experience). In this way learning is followed.**
- ***Process of Insight;***

  PROBLEM→ INSIGHT→ SOLUTION→ PROBLEM SOLVING
- **Wolfgang Kohler did his experiment on a chimpanzee named 'Sultan'**
- **Criticism;**
  - **Learning is incremental not sudden. E.g. A child learns to walk and then Run**
  - **Learning of an infant cannot be insightful as he/she won't be able to grasp the situation wholistically.**

Social Learning Theory- Albert Bandura

- **An American Psychologist**
- **Book: Self Efficacy (1997)**

  Social Foundation of Thought & Action (1986)
- **Observational or Vicarious Learning (Learning through indirect experiences) is the basis of Social Learning Theory (Thus, also called Observational Theory)**
- **It advocates what we learn is acquired through simply watching & listening to other people.**
- **If a child sees his father throwing utensils because he has not been served food of his taste, child learns such behavior & reproduces it in similar circumstances.**
- **The person whose behavior he/she is observing is known as *'Model'* and Observational Learning is referred to as '*Modeling'*.**
- ***Experiment:*** **Bobo Doll Experiment**

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- ***Process or Steps followed in this kind of learning;***

  1. **Attention**
  2. **Retention**
  3. **Motor- Reproduction**
  4. **Motivation**

Field Theory of Learning- Kurt Lewin

- **Kurt Lewin, a German- American Psychologist (1890- 1947)**
- **Recognized as 'Father of Social Psychology'**
- **Books: (1) A Dynamic Theory of Personality (1935)**
  (2) The Complete Social Scientist- Compiled by Martin Gold (1999)
- **Gave Field Theory in 1917 on the basis of his PhD studies**
- **Lewin Says, Human Behavior is the function of both, PERSON and ENVIRONMENT (Expressed as B= f (P,E)**
- **Where B= Behavior**
  P= Person
  E= Environment
  F= Function
- **Further, 'P' stands for 'Psychological Person' Not Biological Organism**
  'E' stands for 'Psychological Environment' Not Physiological or Social Environment.
- **F, which is used for 'function' is expressed as Field (Process of Psychological Person and Psychological Environment, AKA 'Life Space')**

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- **Key Concepts:**
    - **Life Space- Same as Psychological Field which is result of process of Psychological Person + Psychological Environment.**
    - **Vector- Force that attracts or distracts the person from goal.**

Theory of Experiential Learning- Carl Roger (1902- 1987)

- **Influenced by Psychotherapy & Humanistic Approach of Psychology.**
- **It was primarily employed to explain Learning Mechanism of adults but later on applied on adolescent & school going learners.**
- **Carl Roger distinguishes two types of Learning**
    - **Cognitive Learning**
    - **Experiential Learning**
- **He says, Cognitive Learning is Meaningless until Learner uses it. For example; History Dates, Pythagoras Theorem**
- **Characteristic of Experiential Learning;**
    - **Associated with application of acquired knowledge**
    - **Execution of Learning**
    - **Personal Involvement of Learner**
    - **Self Initiation**
    - **Self Evaluation**

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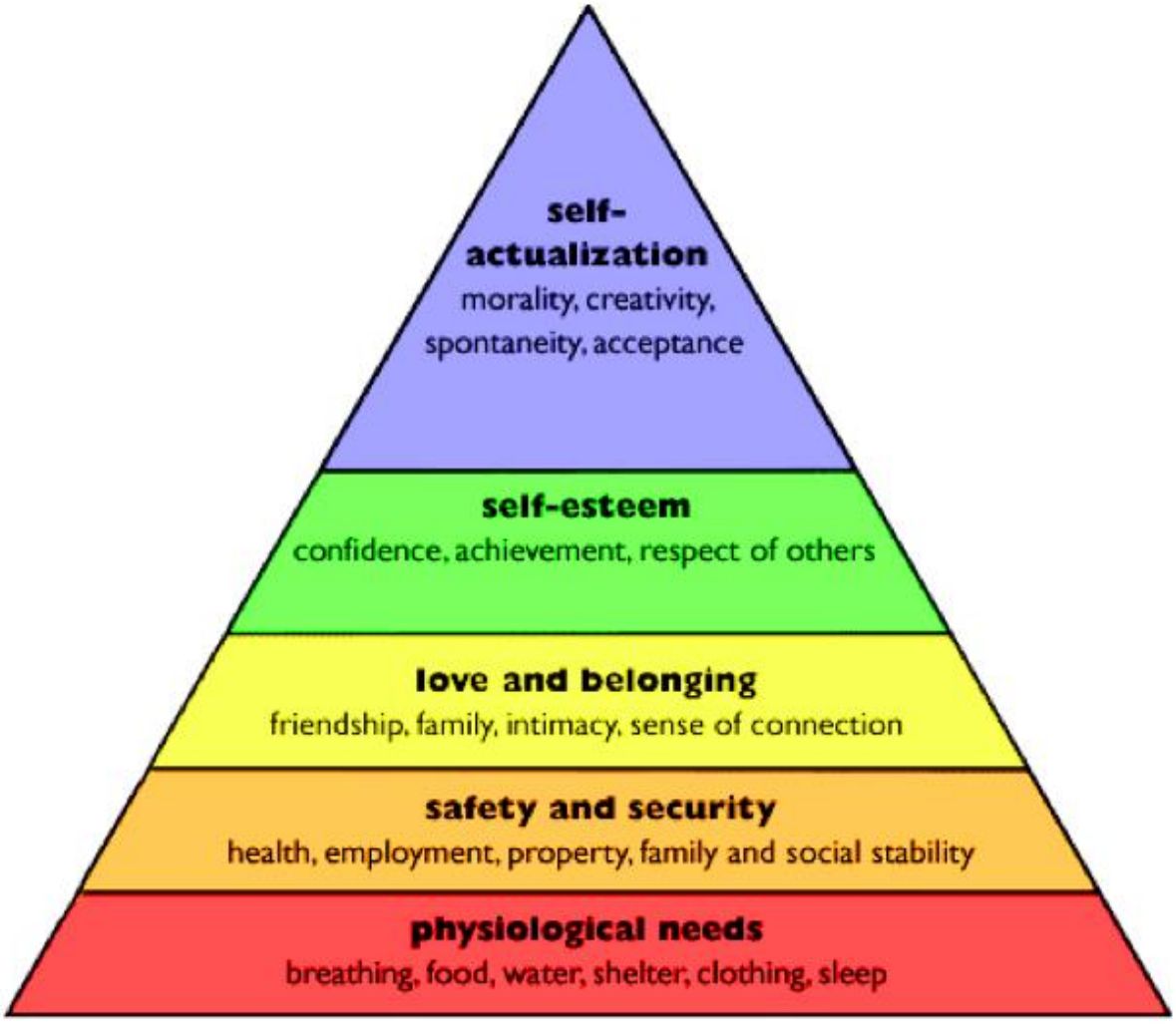
Humanistic Theory of Learning- Abraham Maslow

- **Abraham Maslow, an American Psychologist (1908- 1970)**
- **Maslow says, Learning is based on 'Needs'**
- **In 1954, he proposed 'Maslow Hierarchy of Needs' in his book 'Motivation & Personality'**



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- The lower needs of the hierarchy are known as 'Deficiency Motivation' because they are triggered by some deficit.
- Needs at the higher level are known as 'Growth Motivation'

Contiguous Conditioning- Edwin Ray Guthrie

- AKA Substitution Theory
- Experimented on Rabbit
- Influenced by Pavlov, Thorndike & Watson

Neuro-physiological Theory- Donald Hebb

- Brain's Central Nervous System play key role in learning.
- Combination of S-R Theory and Gestalt Theory

Systematic Behavior Theory- Clark L. Hull

- Based on Pavlov & Thorndike Theory
- Propounded Continuous Re-inforcement

Sign Learning- Edward Tolman

- Experimented on Rats & Monkeys
- Says, Learning is purposeful and goal oriented
- Building S-R connection is essence of learning
- With number of repetition learner develop Cognitive Map or Mental Representation

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Three Stages Information Processing Theory- Atkinson & Shiffrin

- Three stages of Information processing for learning
    - Sensory Registry Level
    - Short Term Memory or STM Level
    - Long Term Memory or LTM Level

Theory of Level of Processing- Kraik & Lokhart

- Anti- thesis of 'Three Stages Information Processing Theory
- Memory has only one type and it cannot be divided in SRL/ STM/ LTM

Transfer of Learning:

- Learning of one situation influences learning of another situation is referred as Transfer of Learning. For example; a badminton player finds it easy to play tennis.
- AKA 'carry- over of learning'

Types of Transfer

1. Positive Transfer- When learning of one situation proves helpful to the Learner in another situation. For example; Knowledge of Mathematics may facilitate learning of Statistics
2. Negative Transfer- When learning in one situation hinders learning in another situation. For example; Left hand drive & Right hand drive.

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3. **Zero Transfer- When learning of a situation doesn't have direct significance over the learning of another situation. For example; Learning to play guitar doesn't help in cooking.**

Theories of Transfer of Learning

Theory of Mental Discipline

- **AKA Faculty Theory**
- **Human mind is composed of various faculties (Memory, Attention, Imagination, Reasoning, Judgment etc.)**
- **These faculties are known as 'Muscles of Mind' which can be improved with Practice. For example; if a person memorize a long passage, it can help in memorizing another long passage.**
- **The theory of Mental Discipline was challenged by William James who memorized a paragraph in 132 min. and similar other in 138 min.**
- **Thus, this theory is rejected today.**

Apperception Theory

- **Apperception is a process of relating new ideas to a store of old ones.**
- **The storage of old ideas is called 'Apperceptive Mass'**
- **The day to day learning have a huge build up of apperceptive mass (stock) in sub- conscious mind.**
- **Hence, Apperceptionists first emphasis on building up of huge apperception mass (powerful reservoir) related to a particular learning area than try to strengthen the learning by repetition (Bring the reservoir into consciousness)**

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Theory of Identical Elements- Thorndike/Identical Components- Woodworth

- Transfer of learning from one situation to another is possible if there are identical elements or components in the situations. For example; Typing and playing piano both need Eye-finger coordination

Theory of Generalization- Charles Judd

- This theory insists systematic organization or generalization of experience, In order to achieve maximum transfer of learning.

- (1) Theory → (2) Practical→ (4) Practical

Transposition Theory- Gestalt Psychologists

- Identical elements do not get transfer automatically unless one has developed proper insight
- The process of developing insight is called transposition

Theory of Ideals- W.C Bagley

- Role of Ideals/ Values is emphasized in transfer of learning
- Learning of Cleanliness can be transferred from one situation to another only if cleanliness is embedded in values

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